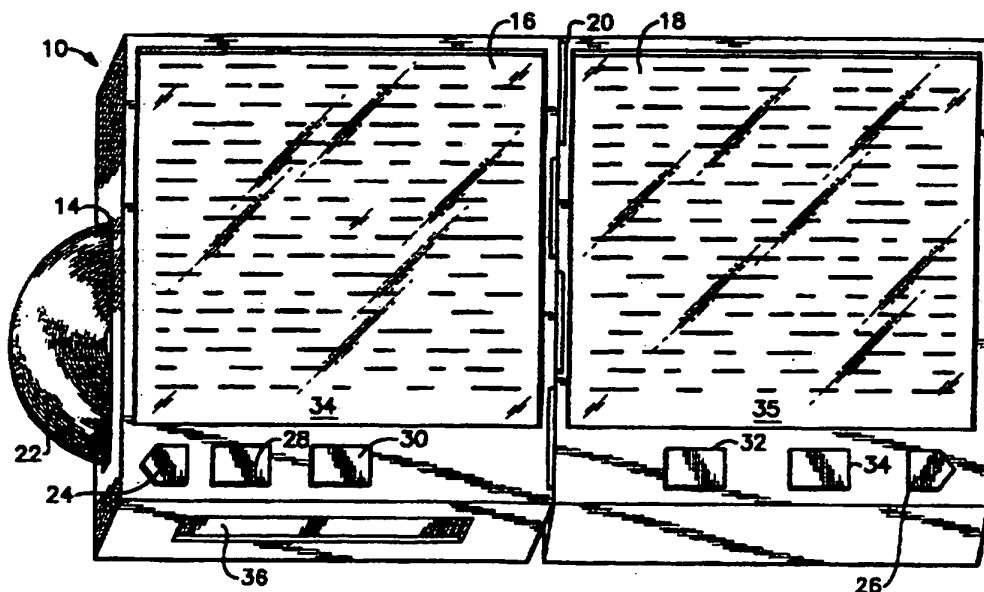




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : G06F 3/14, G09G 3/02	A1	(11) International Publication Number: WO 97/10541 (43) International Publication Date: 20 March 1997 (20.03.97)
(21) International Application Number: PCT/US96/14420 (22) International Filing Date: 3 September 1996 (03.09.96) (30) Priority Data: 08/527,646 13 September 1995 (13.09.95) US (71)(72) Applicants and Inventors: PETRUZZI, James, Daniel [US/US]; 13760 Noel Road #820, Dallas, TX 75240 (US). MASON, Robert, Michael [US/US]; 13760 Noel Road #820, Dallas, TX 75240 (US). (74) Common Representative: PETRUZZI, James, Daniel; 13760 Noel Road #820, Dallas, TX 75240 (US).	(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>	

(54) Title: ELECTRONIC BOOK READER



(57) Abstract

An electronic book reader (10) for displaying the contents of a memory device like a compact disk (22) in a page by page format. The book reader (10) includes a processor for converting the digitally stored contents of the book to a user-readable format and a display (16, 18) of the book a portion at a time. The book reader (10) also includes controls (24, 26) for displaying pages of the book at a time and turning of pages consecutively. A preferred embodiment of the invention includes a processor that records the last page displayed upon activation of the off switch. The preferred embodiment further includes physical storage for compact discs or other digital storage media.

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Electronic Book Reader

Field of the Invention

This invention relates generally to an electronic display of digitally stored information and more particularly to an electronic book reader for the convenient display and storage of the digitally stored contents of books.

Background and Summary of the Invention

Books in their present printed form can be bulky and heavy, making the carrying and transport of numerous books difficult and cumbersome. With the advent of digitally stored media, entire books can be stored on an electronic storage medium such as a floppy disc, compact disc, flash memory or Electrically Erasable Programmable Read Only Memory (E²PROM). The compact disc (CD) has become one of the cheapest methods for the storage of data and is lightweight and resistant to mishandling and erasure of data. However, the only currently available means to convert the digital data stored on a CD is the personal computer. The personal computer is useful for manipulating data and performing complex calculations but is more than needed for simply reading the contents of a book stored on a CD.

Accordingly, it is an object of the present invention to provide a device that permits a user to read or listen to a digitally stored book on a portable electronic reader. A user will no longer need a personal computer to read digitally stored media but rather will have a convenient and portable electronic reader that will allow the user to page through a book in the same manner as reading a printed book. The book reader will permit the user to "flip" to any page in the book and mark a place with an electronic bookmark when the book is put down. The book reader will also permit a user to enlarge pages for those who need larger type to easily read a book or allow the user to listen to the book as a computer generated voice reads the book.

It is a further object of the invention to provide the user the ability to carry multiple books at a time in the form of compact discs or other digital storage media and have a means for reading those books available when desired. The invention will allow for the storage of multiple CD's or other digital storage media so that the user can carry with him or her a number of book titles when traveling or moving.

It is yet a further object of the invention to provide a book reader that is easy to use and requires little or no familiarity with personal computers. The invention will be user controlled but with dedicated feature buttons that require no previous computer experience.

Other objects and advantages of the invention will be apparent upon considering the attached detailed description in reference to the drawings included therein.

Brief Description of the Drawings

The disclosed invention will be described with reference to the accompanying drawings, which show important sample embodiments of the invention and which are incorporated in the specification hereof by reference, wherein:

Figure 1 is a perspective view of the electronic book reader in an embodiment according to the present invention showing a display of two pages at a time;

Figure 2 is a block diagram of the operating features of the electronic book reader;

Figure 3 is a flow diagram of the functions of the book reader; and

Figure 4 is an alternative perspective view of the electronic book reader showing an enlarged display of one page.

Figure 5 is an alternate embodiment of the present invention.

While the invention has been described in connection with preferred embodiments, it will be understood that we do not intend to be limited to the particular embodiments shown but intend, on the contrary, to cover the various alternative and equivalent constructions included within the spirit and scope of the appended claims.

Detailed Description of the Preferred Embodiments

Figure 1 shows a perspective view of a preferred embodiment of the electronic book reader with screens displaying two pages at a time. Book reader 10 is a folding case that contains the memory reader 14, appropriate microprocessor circuitry for processing and control and display screens 16 and 18. The case has middle hinge 20 and opens to approximately book size for convenient and easy handling. Compact disc 22 is inserted into the memory reader 14 which activates the reader and causes it to read the digitally stored contents and display the title page of the book on screens 16 and 18 in a user-readable format. Memory reader 14 could easily be adapted to receive other digital storage media such as a floppy disc or flash memory card. The memory reader 14 could also be activated by an "on" switch. The display is configured to display the pages of the book in sequential order and allow the reader to see two pages at the same time as in reading a printed book. To change pages the reader activates the book reader through controls 24 and 26 to accomplish the page reverse and page forward features, respectively. Such controls could alternatively be located along the side of the case for easy manipulation with the thumbs. The case also contains physical storage 36 for the convenient storage of floppy discs, compact discs, or other storage medium so that the user can carry around at one time multiple books without the inconvenience of carrying a heavy load.

Additional features may be added through control buttons 28, 30, 32 and 34 that perform functions such as marking a particular page, going to a table of contents or performing a page location or "Go To" function. It will be obvious to one skilled in the art that numerous additional functional controls can be developed so long as they can be conveniently configured to fit on the book reader. Other features that could be used might be display of the dedication page, book cover or dust jacket, contents, a summary of the book and how many pages are left for the user to read.

An additional feature is the ability to enlarge a page and display one page in the space previously reserved for two pages. This will enable those who have trouble reading the small print of a book to read more easily. At any time, the user can switch from enlarged view to regular view.

Figure 2 depicts in block diagram form the interaction of the main components of the book reader. Processor 30 is a standard control microprocessor that controls the essential operation of the book reader. Processor 30 controls the memory 32 and manipulates the digital information for display 34. The processor is activated by external control 36 in the form of buttons such as those depicted as numbers 24 through 34 in Figure 1. It will be obvious to those skilled in the art that there are numerous ways to achieve through microprocessors and other circuitry the functionality needed to display digital information from a memory device.

Figure 3 depicts a flow diagram for the operation of the basic features of the invention. Upon activation of the book reader at block 50, the processor checks to see whether a particular page was marked for return display at block 52. Activation can be either through insertion of a memory storage device in the memory reader or by activating an "on" switch. If a particular page was marked for return display, the processor locates that page and displays it in the appropriate display half of the reader at block 54. If no last page was marked, then the processor opens the book to the title page at block 53 and awaits further instruction.

If the processor is activated by a page change command at block 56, the processor senses whether it is a page forward command at block 58 or a page backward command at block 60. If page forward is selected, the processor changes the display to the next two pages in the book. If page backward is selected, the processor changes the display to the previous two pages in the book. This process proceeds much in the same way as one would turn the pages of a printed book. Page changing could also be done sequentially so that the contents of the right screen are moved to the left and only the next page in order is displayed for the first time. Similarly, for certain foreign texts such as Chinese, page changing could be in the reverse from right to left.

If the processor receives enlarge command at block 62, the processor displays, for example, the top half of the left side display page in an enlarged mode across the two display screens at block 64. Once placed in enlarged mode, page forward and page backward commands at blocks 58 and 60 will cause the display to display the next or previous half page that immediately precedes or succeeds the displayed page. At any time,

the user may return to the two page display format by selecting a return function at block 66 and displaying the two page set associated with the currently displayed half page at block 68.

Another feature that may be utilized is the "go to" feature shown at block 70. If the user desires to go to a particular page, the user selects the "go to" function at block 70, selects a page at block 72 and the processor displays that page in its two page set at block 74. If the user is using the enlarged mode, the display will go to the first half of the selected page and display it over the two screens. Similarly, if the user desires to go to the table of contents, the user may select that function at block 76 and the processor will display the table of contents at block 78.

If "off" command 80 is activated, the processor records the current page number displayed on the left screen at block 82 and stores that in memory contained in the microprocessor and its associated circuitry and turns off the book reader.

Figure 4 depicts the display of an enlarged page to facilitate reading. If the enlarging feature is chosen through a control button such as enlarge button 44, screens 40 and 42 convert from one page on each screen of the display to a half page over the two screens. Display screen 40 shows the left half of the upper half of a page and display screen 42 shows the right half of the upper half of the page. This way the pages are enlarged to double size for easier reading. When the reader is ready to page forward, the unit displays the lower half of the page over the two screens. At any time, the user can return to regular two page display as depicted in Figure 1 and continue reading as normal.

Figure 5 depicts an alternate embodiment 90 whereby screen 92 displays one or more pages and is protected by rolling protector 94. Book Reader 90 has a memory reader 96, control buttons 98, 100, 102, 104 and 106 and is capable of enlargement of text during use. In addition, the location within the stored book contents that are being displayed is graphically shown by status bar 108. As the book pages are changed, status bar 108 reflects how far into the book the reader has reached. A further feature is achieved through speaker 110 that can be activated by any one of control buttons 98 through 106 to cause the processor to output audibly the text for listening. This can permit children or others who are hard of sight to enjoy books they cannot read.

As will be recognized by those skilled in the art, the innovative concepts described in the present application can be modified and varied over a tremendous range of applications, and accordingly the scope of patented subject matter is not limited by any of the specific exemplary teachings given.

For example, while the presently preferred embodiment displays two pages at a time, it is entirely feasible to display four pages at a time using smaller type size. Similarly, two screens do not have to work in tandem and for particular books it may be appropriate to display text on one side and graphics on the other side. When changing the text page, the graphic page may remain on display until further control requires a change, or the graphic page change controlled and coordinated with change of text.

Other sizes of the reader itself may be utilized from paperback size to full notebook size to accommodate even larger font sizes and displays. In addition, a single screen may be utilized on one side of the open book reader or a screen on a single flat case that does not fold for closing may be utilized. The foregoing embodiments are merely illustrative of the possible embodiments. The full scope of the invention is defined only by the issued claims.

While the invention has been described in connection with preferred embodiments, it will be understood that we do not intend to be limited to the particular embodiments shown but intend, on the contrary, to cover the various alternative and equivalent constructions included within the spirit and scope of the appended claims.

Claims

What is claimed is:

1. An electronic book reader, comprising:
 - a processor for converting the contents of a book from digital format into a user-readable format;
 - a display of said contents at least one page at a time; and
 - means for controlling said display whereby pages of said book are displayed.
2. The combination as claimed in claim 1 in which the book reader is approximately paperback book size.
3. The combination as claimed in claim 1 further comprising an on and off switch.
4. The combination as claimed in claim 3 in which the processor records the last page displayed upon activation of the off switch.
5. The combination as claimed in claim 1 further comprising a speaker.
6. The combination as claimed in claim 5 in which the case has means for storing compact discs.
7. The combination as claimed in claim 1 whereby the control causes a display of selected contents of the book.
8. The combination as claimed in claim 1 whereby the control causes the display of an enlarged portion of the contents of the book.
9. A method for storing and displaying the contents of a book comprising:
 - storing the contents of a book in digital format in a memory;
 - reading said memory with a processor to convert said digital format to a user readable form;
 - displaying said contents in a visual display; and
 - controlling said display whereby at least one page of the book is displayed.
10. The method as claimed in claim 9 further comprising the step of displaying an enlarged portion of the contents of the book.

11. The method as claimed in claim 9 further comprising the step of displaying two pages of the book at a time.
12. The method as claimed in claim 9 further comprising the step of storing compact discs in the reader.
13. The method as claimed in claim 1 further comprising the step of outputting said contents audibly.
14. An electronic book reader comprising:
 - a processor for converting the contents of a book from digital format into a user-readable format;
 - a display;
 - and a control of said display whereby a portion of said contents are displayed.
15. The combination as claimed in claim 14 in which the contents are also presented audibly through a speaker.
16. The combination as claimed in claim 14 in which the display is one screen.
17. The combination as claimed in claim 14 further comprising a protector for the display.
18. The combination as claimed in claim 14 in which the position within the contents is graphically displayed.
19. The combination as claimed in claim 14 further comprising a hinge at the center of the case.
20. The combination as claimed in claim 14 further comprising the display of enlarged contents of the book.

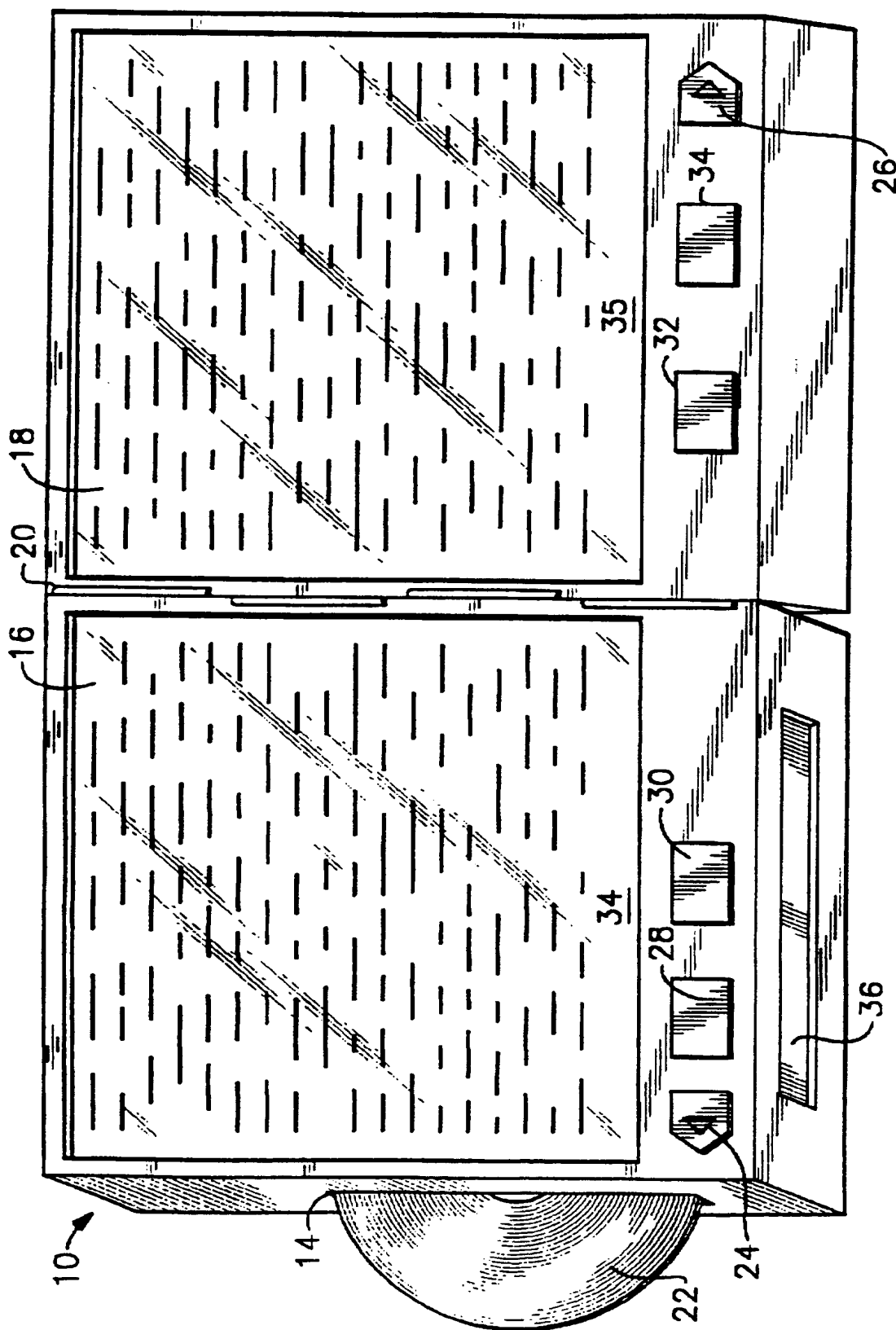
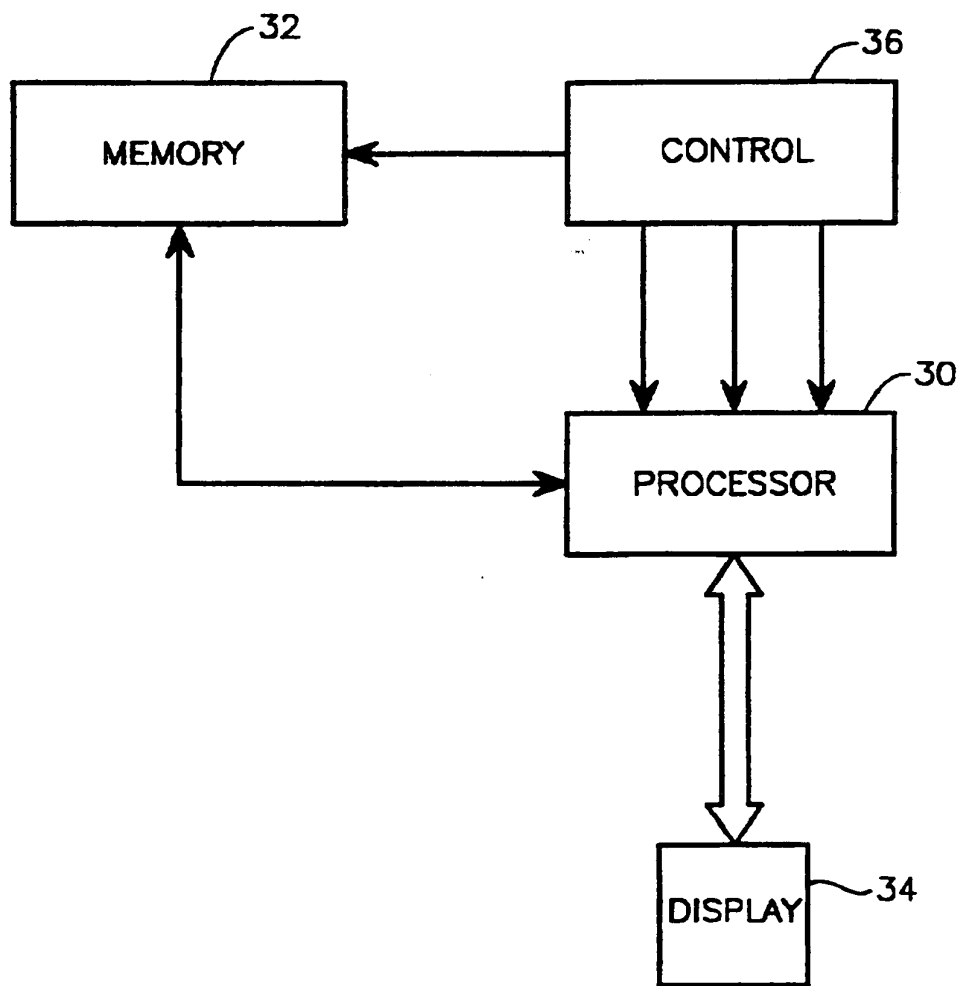
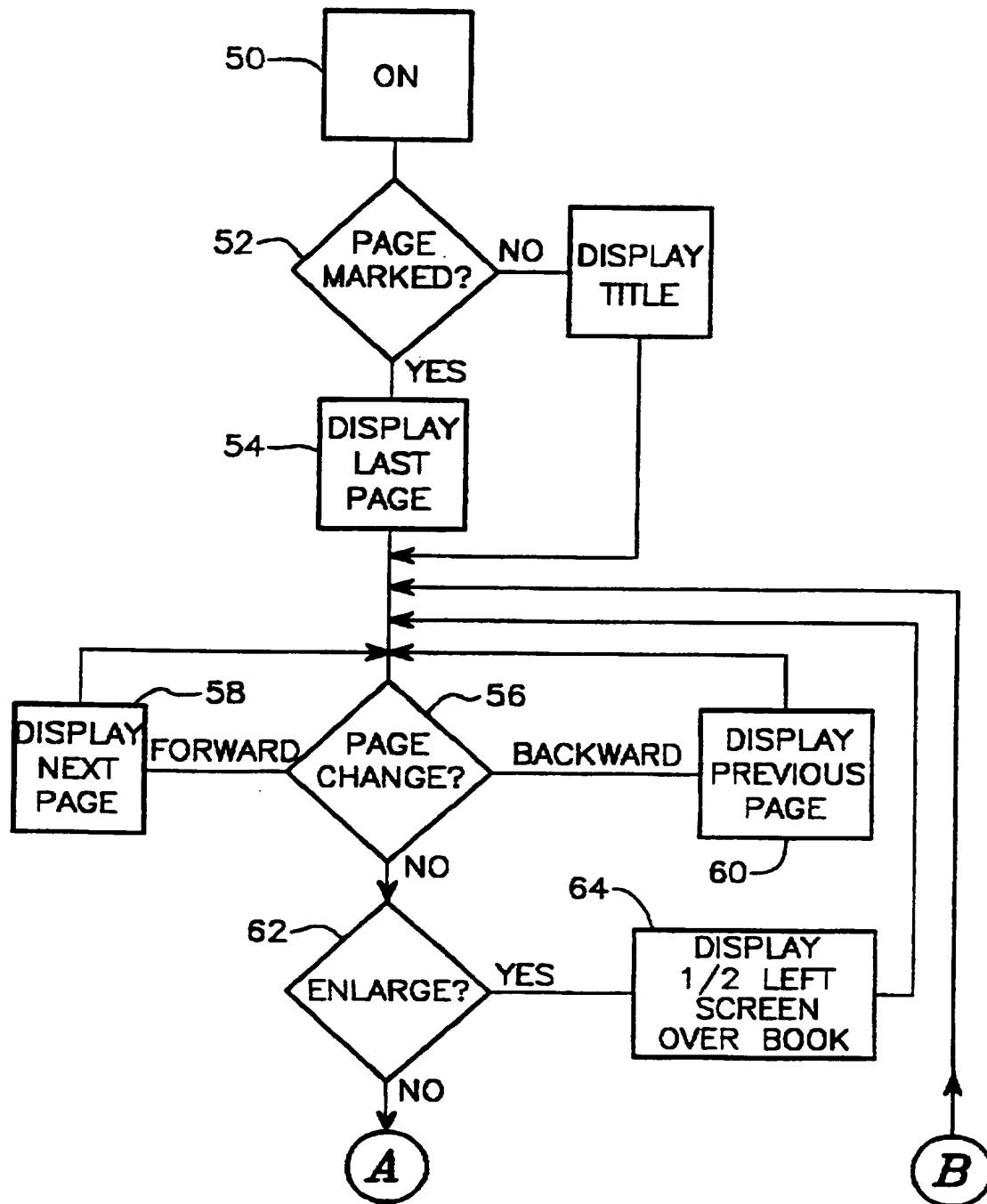
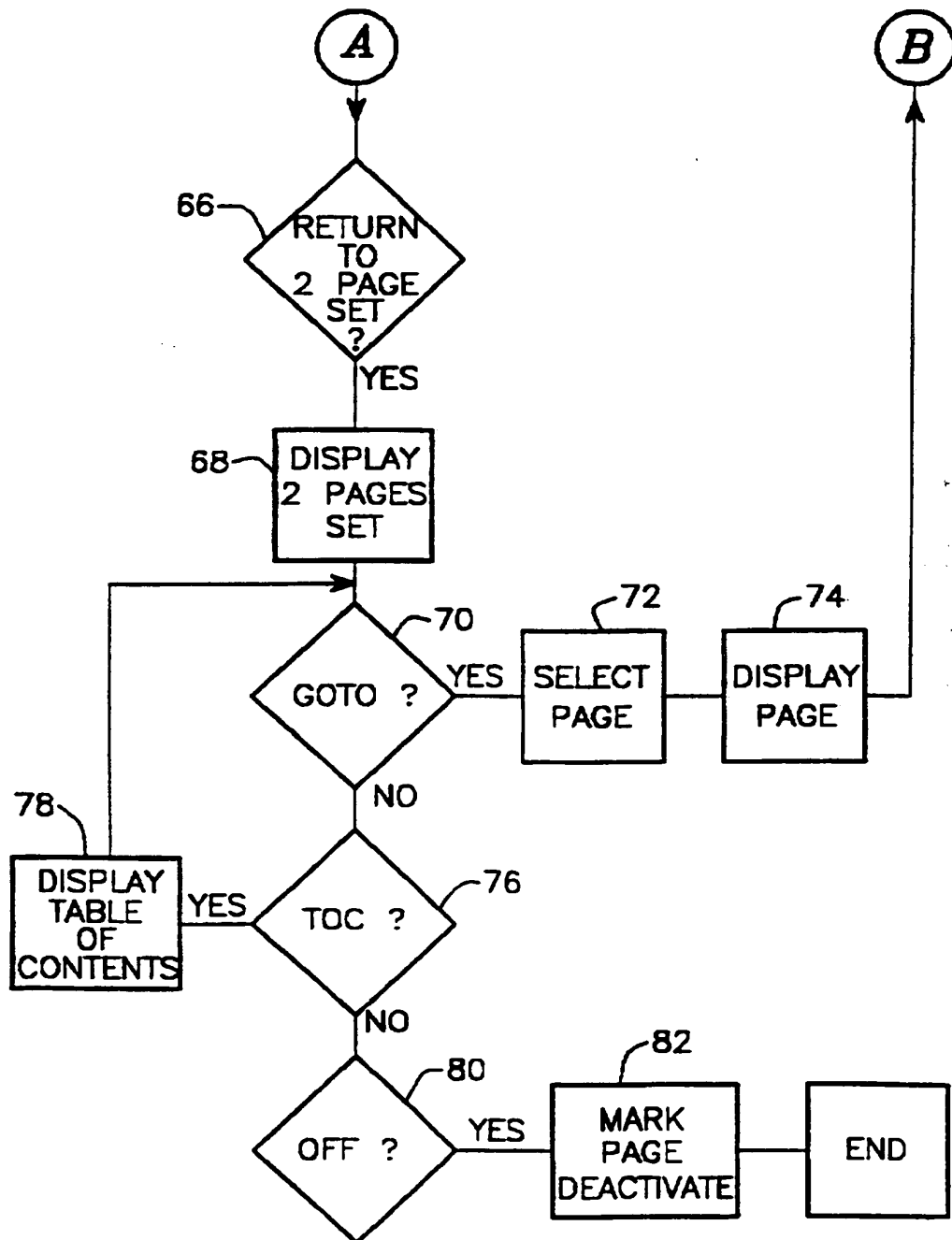


Fig. 1

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*Fig. 2*

*Fig. 3A*

*Fig. 3B*

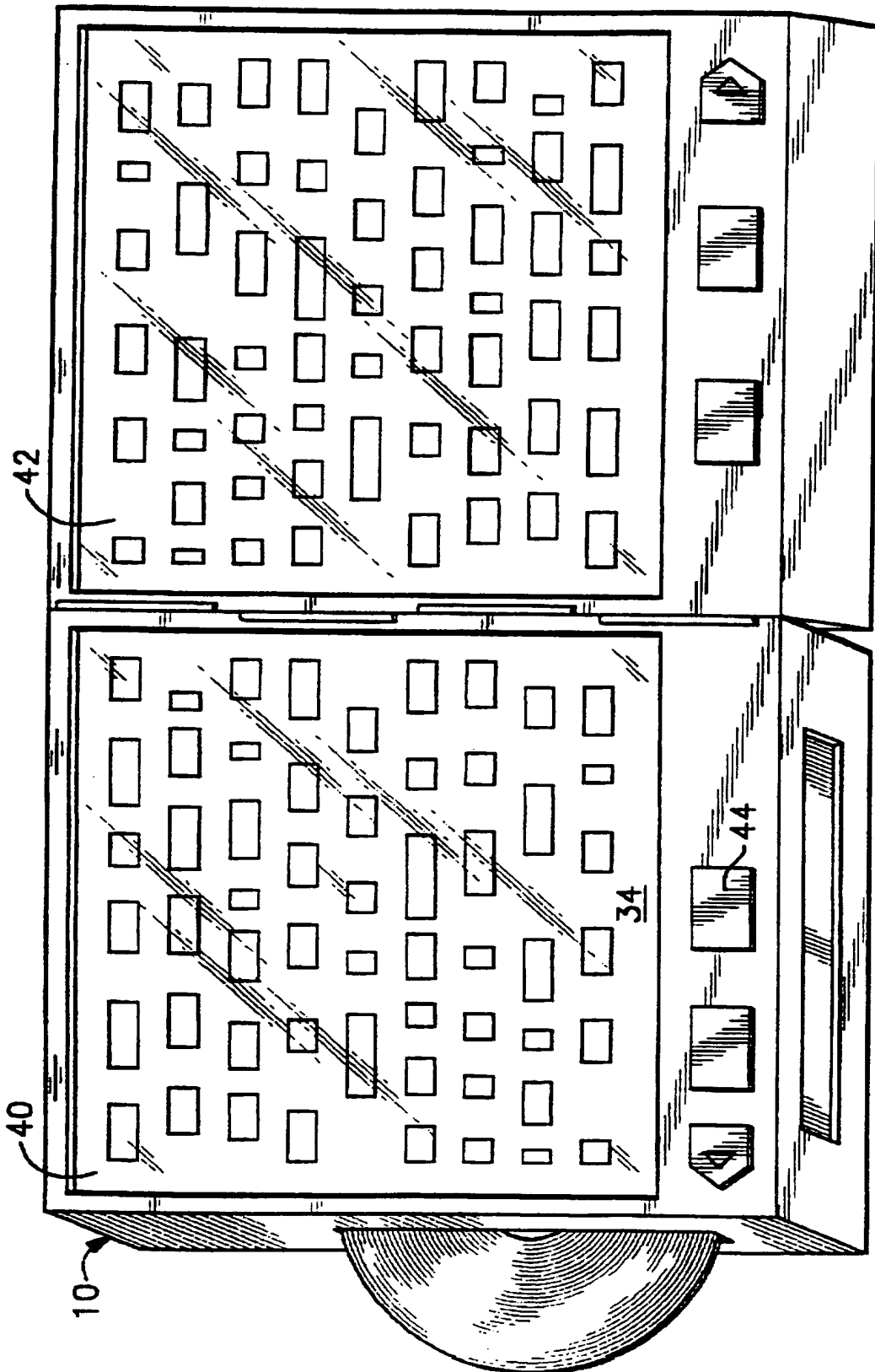
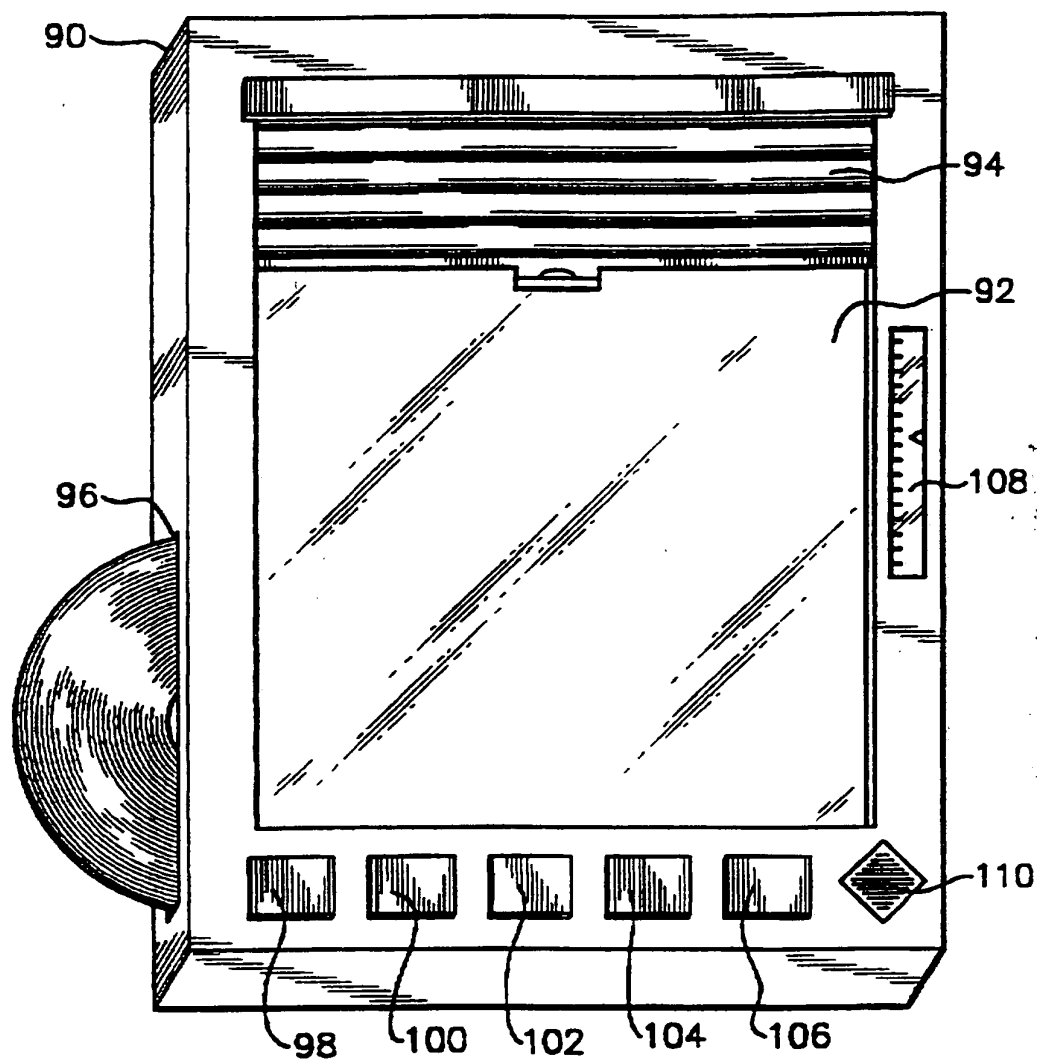


Fig. 4

*Fig. 5*

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INTERNATIONAL SEARCH REPORT

Int. l. application No.
PCT/US96/14420

A. CLASSIFICATION OF SUBJECT MATTER IPC(6) : G06F 3/14; G09G 3/02 US CL : 395/100; 345/1 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 395/100; 345/1,901,903,130 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) APS: electronic book, portable (5a) (display or read)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X, P	US, A, 5,467,102 (KUNO ET AL) 14 November 1995, col. 3, line 26-col. 7 line 31	1-4, 7-12, 14, 16-20
X, P	US, A, 5,475,399 (BORSUK) 12 December 1995, col. 2 line 51-col. 3 line 18, col. 3 line 43-col. 4 line 4	5, 6, 13, 15
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
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10 OCTOBER 1996	06 NOV 1996	
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